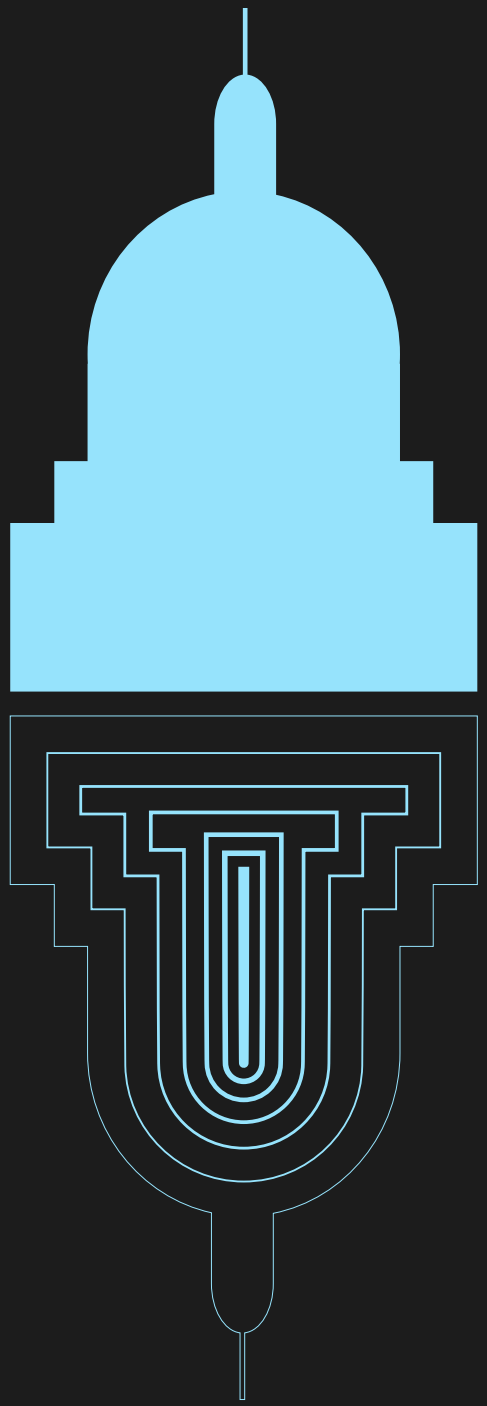
Canton

Unlocking collateral mobility through tokenization: US Treasuries use case

DTCC's LedgerScan connecting to Canton Network



THE EXPONENTIAL
POWER OF CONNECTION

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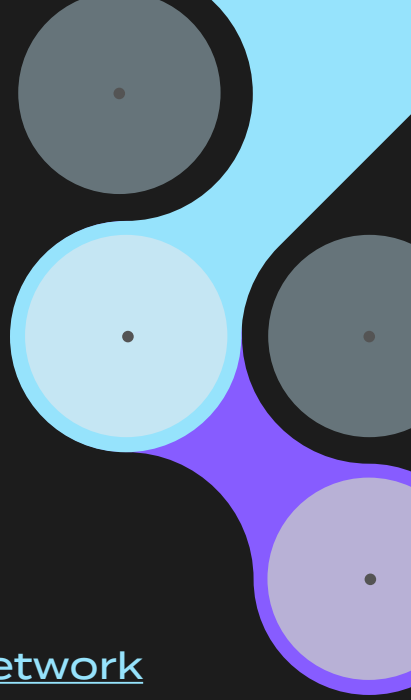
Introduction

During June and July, Digital Asset, DTCC and an industry group of investors, banks, CCPs, custodians/collateral agents and a CSD completed a successful pilot using tokenized US Treasuries (USTs) as collateral. The pilot proved the ability to create a digital twin, use those tokenized collateral assets in real time to satisfy a margin call, complete a recall of the assets, and – most importantly – to evidence secured party control over the assets in a closeout scenario.

The UST Tokenization pilot involved 26 market participants using 21 Canton nodes. Four types of cross-application transactions were connected using 11 distributed applications. In all, over 100 transactions were completed.

The pilot follows the successful Canton Network Pilot completed in December 2023, which set the stage for composable applications that can be used across a global economic network. After demonstrating an interoperable network of multiple parties and applications, several projects are underway to explore more targeted use cases and production solutions in response to participants' requests. To facilitate this exploration, Digital Asset made a pilot platform available in Canton Network that allows participants to use real world assets in complex transactions across multiple parties using the Canton Network.



About Canton Network

Canton is the first privacy-enabled open blockchain network, ensuring limitless connections that preserve privacy. Enabled by unique smart contract technology, network participants can confidently exchange data and value to unlock the potential of synchronized financial markets.

The public-permissioned blockchain network includes a decentralized synchronization service – the Global Synchronizer – designed to respect privacy and institutional sovereignty.

In the tokenized USTs pilot, independent Canton blockchains used this service to interoperate and execute atomic transactions, while ensuring participants remained in complete control of their services and data" might be better. This preserves the stability of trusted regulated processes while offering the transformative power to connect.

The market rationale for tokenizing USTs

While the types of transactions requiring collateral, as well as the required amounts and quality of collateral, have increased dramatically in the past two decades, only a small portion of assets are being mobilized today. SIFMA data shows a $230 trillion universe of marketable securities, yet the global collateral market is just $25.5 trillion.[1,2]

USTs are a critical source of high quality liquid assets and their desirability and accessibility makes them a natural choice for this pilot. In 2022, USTs accounted for 67.7% and 70.1% of collateral held in bilateral and tri-party repo markets, respectively.[3]

With approximately $25T outstanding, USTs represent the largest pool of available high quality liquid assets.[4] They are considered risk-free and safe-haven assets for investors and the deepest and most liquid bond market in the world.[5]

1. *2023 Capital Markets Fact Book, SIFMA, July 2023*
2. *Finadium, Jan 30 2023*
3. *SIFMA US Repo Markets: A Chart Book, Feb 2022*
4. *Finadium, Rates & Repo Preview: mandatory clearing of UST repo, Oct 19, 2023*
5. *IMF Global Markets Analysis, Expanding Central Clearing in US Treasury Markets: Benefits and Costs, Nov 11, 2022*

About the pilot

The pilot explored leveraging distributed ledger technology to support market connectivity across the collateral management lifecycle to enhance mobility, liquidity and efficiency of tokenized UST. As the highest quality collateral, USTs were a natural choice for this industry effort focused on proving tangible value from tokenization.

The first step was to create a digital twin as defined by the CFTC's GMAC Digital Asset Classification Approach and Taxonomy.[6] The digital twin is locked to the transaction and works through all phases of a collateral transaction, from margin call to asset recall and closeout.

While one aspect of the pilot focused on the enhanced mobility that 24x7 immediate settlement enables, another key outcome was to demonstrate the perfected securities interest over collateral - and importantly, to prove the ability to seize control of the asset being used as collateral. This is the underlying principle beneath the use of collateral in any transaction. Should the collateral provider default, the secured party (or collateral receiver) must have a clear and undisputed right to the asset, and to give direction for its custody and use. Therefore, one goal of this pilot was to go beyond day-to-day transaction flows and demonstrate the secured party's ability to take control of an asset in the event of a default, proving how smart contracts improve on the control in real-time.

6. *A digital twin is defined as 'an electronic controllable record representing an asset that has been immobilized on another system of record, and reconciled with that original system of record to ensure ownership is reflected precisely'. A tokenized security is a digital twin token that represents an underlying security or financial instrument issued on a different platform (e.g., a traditional CSD or registrar), where such representation itself satisfies the definition of a security/financial instrument under local law. CFTC's GMAC Digital Asset Classification Approach and Taxonomy, Mar 6, 2024*

Structure and participation

The pilot participants included:

Banks	4
Custodians/collateral agents	3
FMIs, including DTCC	3
Investors	4
Observers (legal, regulatory, academic, consultancy)	6
Technology providers, including Digital Asset	6

Digital Asset used the Canton Network TestNet to create the UST Collateral Network Pilot Platform and provided the Canton nodes and Global Synchronizer used in the pilot.

The DTCC's LedgerScan[7] was connected to the UST Collateral Network Pilot Platform enabling a uniform view across the different custodians and collateral agents.

Together, Digital Asset and DTCC provided the infrastructure, applications and connectivity needed for market participants to test complex business scenarios in a real world, production-like environment.

The pilot schedule was accelerated by using existing registry and margin applications from the Canton Network Pilot. To actively involve all participants, 11 distributed applications and 21 nodes were deployed, with the Global Synchronizer keeping everything in sync and enabling atomic transactions across the different applications and parties. In all, 104 cross-application transactions took place.

7. LedgerScan observes the transaction streams from traditional and digital ledgers to produce a real time market scale accounting record of ownership, encumbrance and risk management metrics.

Tokenizing and mobilizing USTs as collateral

Using synchronized, connected sovereign blockchains, tokenized USTs are created and used as collateral to satisfy a sequence of margin calls. In the event of a default, secured parties can seize UST tokens and the underlying real world assets (RWAs).

Organizations 26

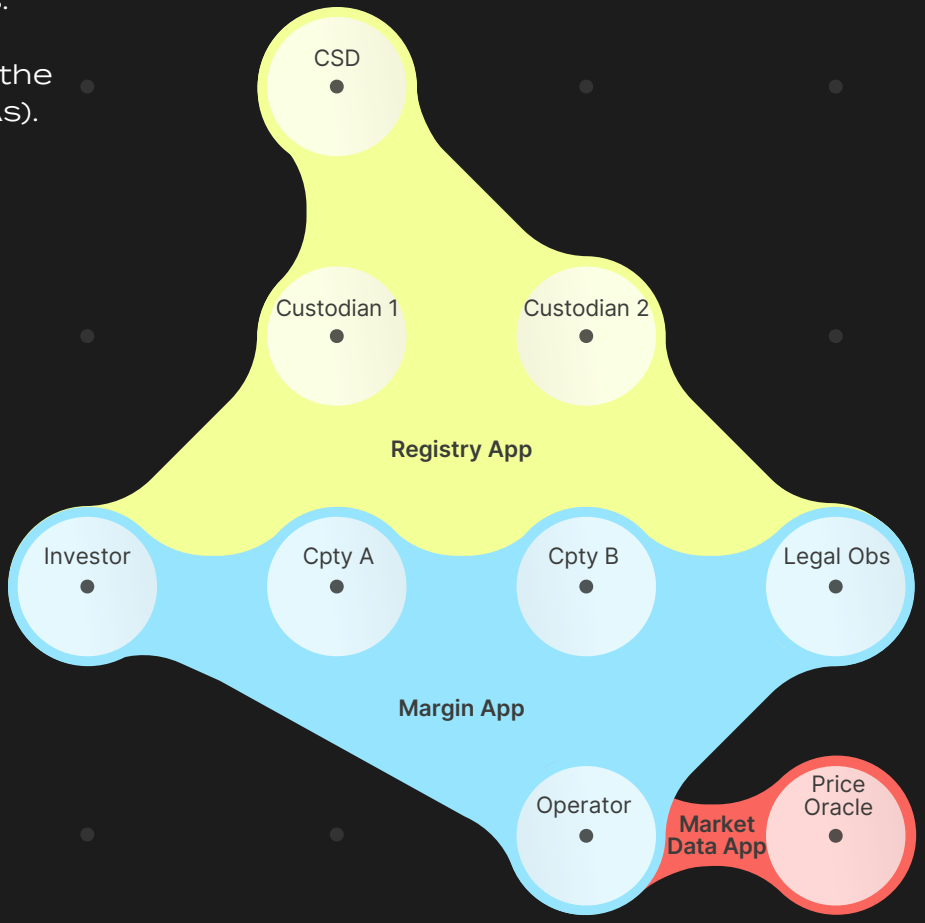
Registry apps 4

Margin apps 6

Price oracle 1

Participant nodes 21

Transactions 100+



*Central Securities Depository (CSD)
Counterparty (Cpty)

Use cases

For the pilot, four use cases simulated real transaction flows.

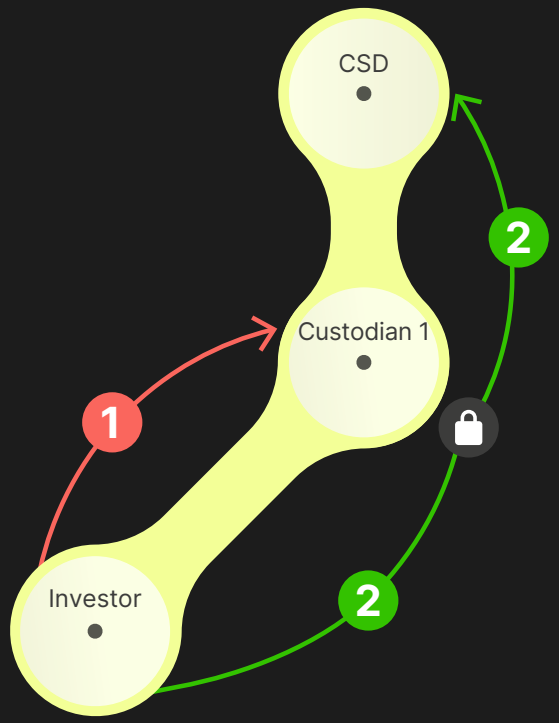
The first three use cases demonstrated how tokenized collateral assets can be created, posted in real-time, and moved seamlessly and efficiently between different clearinghouses and prime brokerages to satisfy margin obligations and optimize capital allocation and efficiency. The final use case demonstrates how secured parties can perfect title, take control over the tokenized and underlying real world asset, and ultimately liquidate collateral assets in case of a default of a trading counterparty.

Digital Twins

Create a digital twin for USTs

Investor asks custodian to create a digital twin of existing USTs held in their portfolios. The custodian sets aside an equivalent amount of the RWA that cannot be used for anything else but back that digital asset. Holdings are updated instantly.

Note: While the digital twin itself could be used for anything (trading, lending, collateral, etc.), during the pilot it was used in the margin app to collateralize transactions.



Investor creates a digital twin token for their UST position.

Setup. Custodian 1 has a UST position for the investor at the CSD.

1. **Investor requests the creation** of a digital twin token.
2. **Custodian verifies Investor's** UST position at the CSD. Digital Twin token is created for Investor by Custodian. CSD is updated.

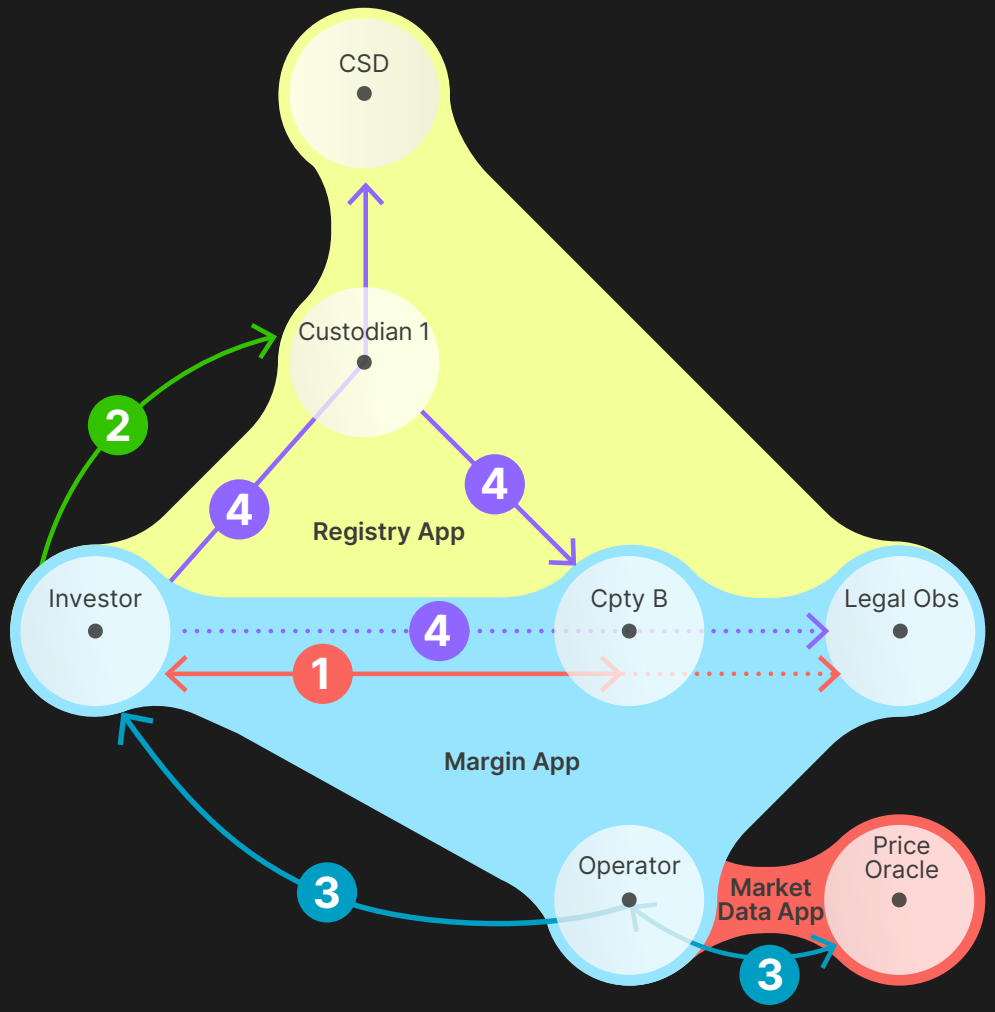
Outcome. Investor now has UST digital twin tokens registered with the CSD, custodied by Custodian 1.

Collateral Mobility – Delivery

Margin call delivery (USTs are encumbered)

Secured parties (banks/CCPs) make a margin call for delivery and USTs are used as collateral. Both sides see the status of a transaction and details of the legal agreement in real time. Investors agree to the margin call and select the collateral they want to use. In an atomic transaction, the assets are transferred and the margin call is settled immediately. Pledged collateral is instantly updated in the registry apps, where the underlying USTs and the digital twin are locked to that margin call, removing the need for market movements or potential fails. Locking the collateral also assures it can be legally seized in the Closeout workflow.

Note: Pricing data can be provided by the secured party, valuation agent, or fed in by the margin app provider.



Delivery. Investor must deliver collateral to Cpty B re: GMSLA.

1. **Issue and agree to margin call** for delivery, notifying legal observer.
2. **Investor selects** unencumbered UST.
3. **Compute eligibility and quantity** to deliver based on haircut and price.
4. **Deliver collateral.** Tokenized UST is instantly encumbered, the margin call is settled, and the Legal observers are apprised.

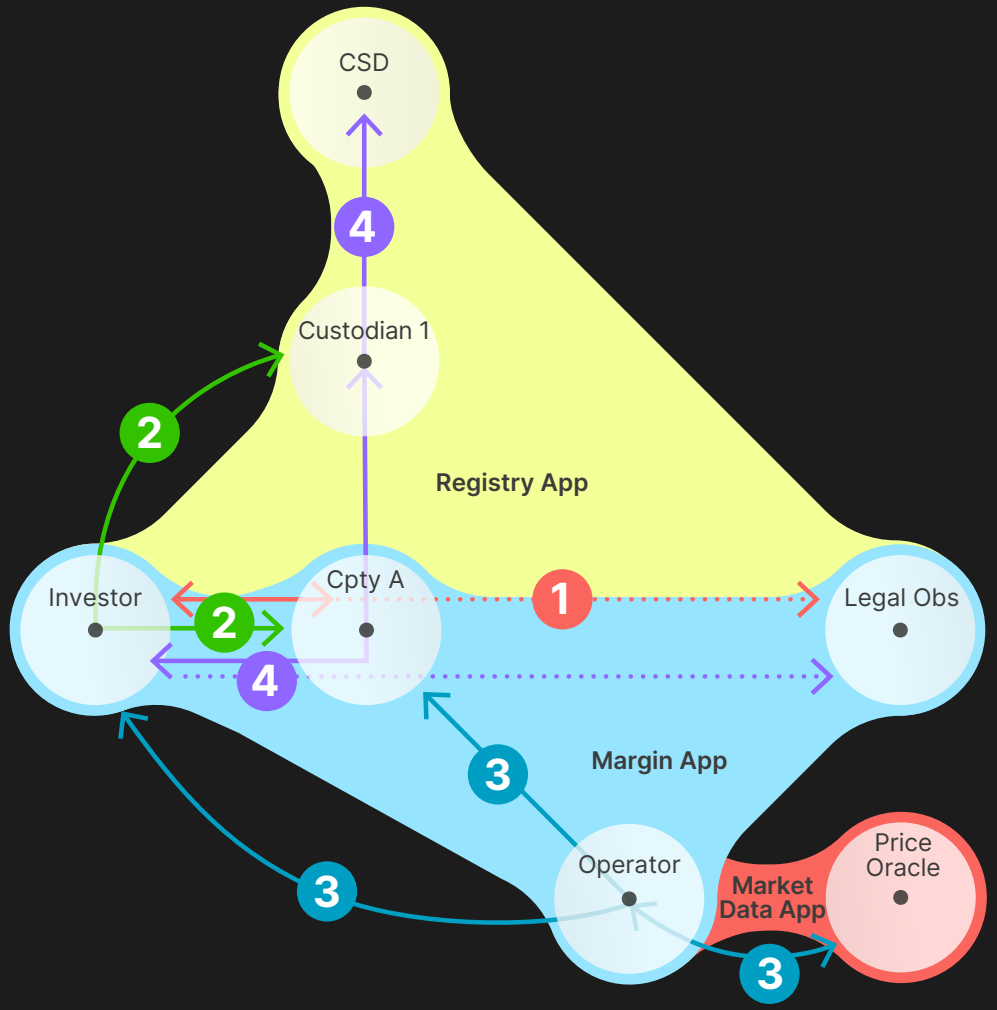
Outcome. Collateral is delivered. UST is now locked at Custodian 1, for the benefit of Cpty B as the secured party.

Collateral Mobility - Return

Margin call return (USTs are unencumbered)

Investor calls for return of margin and selects the USTs they want returned. The collateral is released and the margin call is instantly settled. Since the investor gets the collateral back immediately, the unencumbered asset can be used as collateral for another transaction, lent or repo'd out, or traded. This significantly improves both liquidity and collateral optimization: it becomes faster and simpler to recall and substitute collateral intraday to free up assets for other purposes.

Note: Today, margin call returns typically take place one or more days after the initial transaction. These use cases allow margin call delivery and returns to take place more quickly, reducing daily risk and increasing asset utility.



Return. Investor calls for a return of UST, and is entitled to a return from Cpty A.

1. **Issue and agree to margin call** for return, notifying legal observer.
2. **Investor consults** their encumbered holdings at Custodian 1 and selects USTs to return.
3. **Compute quantity.** To compute how much to return, haircut and price must be taken into account.
4. **Return UST.** Instantly unencumber UST at Custodian 1. Settle margin call. Apprise legal observers that the margin call was effectively settled.

Outcome. Return is settled. Investor owns, unencumbered, the returned USTs.

Closeout

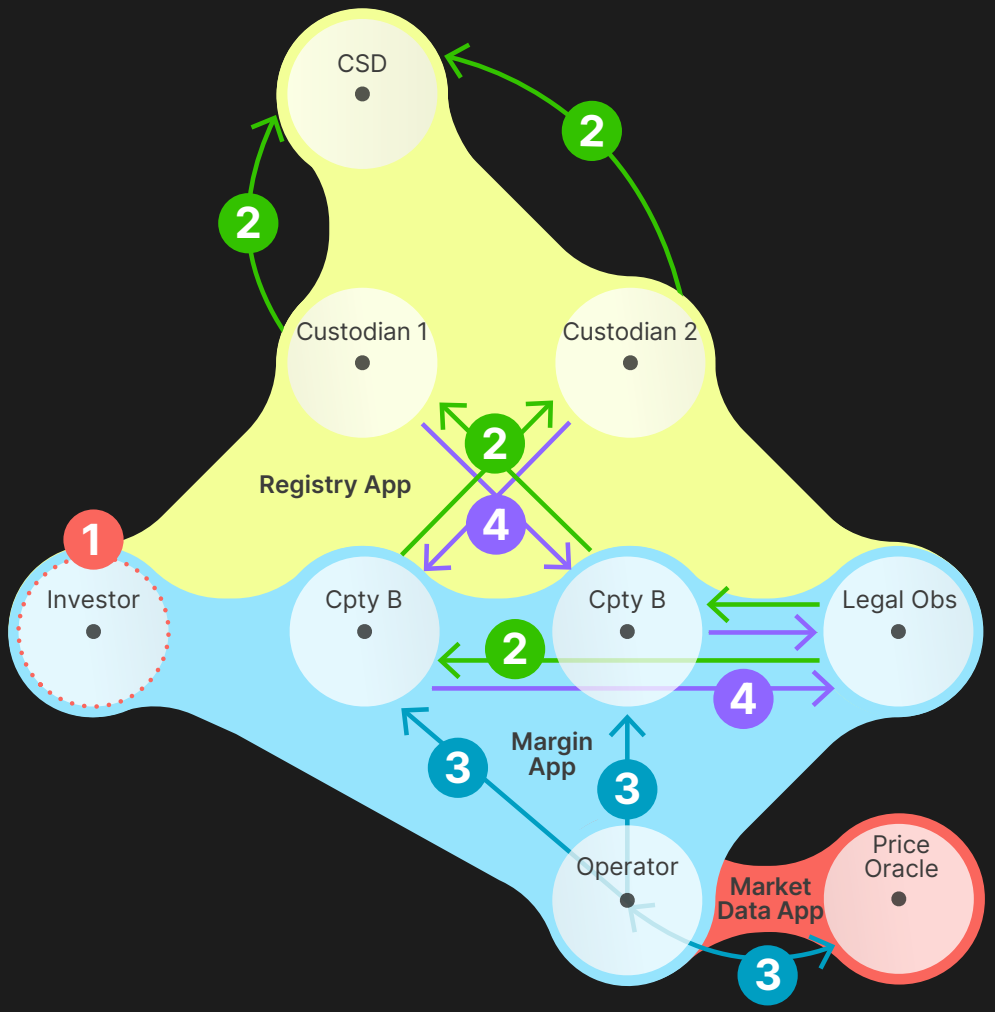
Closeout due to hypothetical default of a counterparty (seizure of assets)

When an investor defaults, the secured party will want to seize some of the assets that have been pledged by initiating a closesout. The defaulted investor is removed from the process, which takes place between the margin app operator, the secured parties and the custodian in accordance with the default processes spelled out in the ISDA, ISLA, GMRA and various other master agreements.

Once the closeout is approved, the secured party selects the collateral they want to seize. The custodian approves, and the ownership of the asset immediately changes from the investor to the secured party in an atomic transaction. The secured party now has control over the asset and the custodian/agent will accept and act on their instructions.

This workflow commences once required offline procedures (i.e., Notice of Exclusive Control) have taken place. Throughout, the transfer of ownership over the asset is fully traceable and auditable on Canton Network and can stand up in a court of law. **See The Importance of Closeout,** page 10.

Note: In the event a secured party was seizing assets from multiple custodians, the seizure of the assets happens atomically with the termination of the workflow.



Investor defaults. Investor has assets encumbered (locked) at Custodians 1 and 2 for Cptys A and B. Cpty A and Cpty B are entitled to take control as the Secured Parties, i.e., they become the owners of some of the assets from the Investor. **Note:** this is a simplified version of a Closeout process.

1. **Investor defaults.** Going forward, Investor will not participate in the workflow.

Ex Parte default workflow. Cpty A and Cpty B obtain off-chain proof of default (e.g., Default Notice) and supply it to Custodian 1 and 2.

2. **Initiate Closeout.** Cpty A and B supply Closeout values and select encumbered UST to seize.

3. **Compute quantities.** Price Oracle provides collateral prices (e.g., MTM at the time of Default in the Default Notice); Margin app operator computes quantities.

4. **Seize collateral.** Collateral is unencumbered and ownership is transferred to Cpty A and Cpty B as secured parties.

Outcome. Cpty A and Cpty B own USTs (tokens and RWAs).

Throughout the pilot, participants could only see the parts of the workflow and data to which they were entitled. The essential privacy requirements of collateralized transactions and margin management were preserved.

- **Banks and CCP**s acted as secured parties to the transaction and took control of the collateral after closeout.
- **Investors** requested the creation of the digital twin and entered into a unilateral collateral agreement with the secured parties.
- **Custodians/collateral agents** were responsible for onboarding and creating the digital twin of the UST to pledge as collateral. They were also responsible for managing the assets after ownership was transferred following closeout.

DTCC could view the changes to all holdings via LedgerScan, which tracks ownership positions across the entire market for both the digital twin and underlying real world USTs and performs reconciliation of those records.

The importance of perfected securities interest

Perspectives from

Jenny Cieplak
Partner, Latham & Watkins LLP

Yvette Valdez
Partner, Latham & Watkins LLP

Manoj Ramia
General Counsel, Digital Asset

Most blockchain pilots focus on the various steps of initiating or completing a transaction. For the tokenized UST pilot, that lifecycle was extended to include default. The default scenario is crucial as the point of having collateral is not simply to offset the risk of a transaction. In the event of a default, the secured party must be able to take legal possession of that collateral.

Doing so requires (1) having a valid security interest in the collateral and (2) "perfecting" that security interest, i.e., ensuring that the secured party's security interest in the collateral prevails over any other party that may claim an interest in the collateral.

Because USTs are held through an indirect holding system, a party's rights to a UST are actually held as a security entitlement, governed under Article 8 of the Uniform Commercial Code (UCC). The question we were presented with was how the introduction of a new concept, the "digital twin", would impact the Article 8 analysis.

"Article 12 was created for two things – first, to govern pure digital assets such as Bitcoin that don't represent any offchain interest. But more importantly for the global financial system, Article 12 and the corresponding amendments to Article 8 start to establish a framework for using distributed ledgers to represent interests in securities. Securities don't exist on the blockchain or anywhere else – they are the bundle of rights that come with the security, such as rights to receive interest and principal, voting rights, and rights on default.

In the indirect holding system, rights in securities are all about books and records. It's only natural to move those records to the blockchain where they can interoperate with other distributed applications. We can see a future where blockchain applications could be used by broker-dealers as official books and records, just as recordkeeping previously evolved towards cloud-based systems."

Jenny Cieplak, Partner at Latham & Watkins LLP

LATHAM & WATKINS LLP

The digital twin nomenclature is adopted from the Commodity Futures Trading Commission's Global Markets Advisory Council for Digital Asset Markets Subcommittee (of which Digital Asset is a member). The subcommittee released its recommendation for an Approach for the Classification and Understanding of Digital Assets (the "CFTC Nomenclature").

The CFTC Nomenclature defines a digital twin as "an electronic controllable record representing an asset that has been immobilized on another system of record, and reconciled with that original system of record to ensure ownership is reflected precisely." This is in contrast to a "digital native", which is defined as "representing the primary record of value, that is not recorded on another system of record and does not require reconciliation with another system of record." The distinction, as implied by the labels, is between a digital version of something that exists somewhere else versus something that only exists in digital form. Accordingly, with the pilot, the tokenized UST is an electronic record representing something that exists outside of the blockchain that records it.

The legal question thus becomes: how does the creation of a digital twin of the UST affect the perfection of a security interest in the UST?

Here, 2022 revisions to the UCC are helpful. The 2022 amendments included the addition of a new Article 12 that was specifically designed to cover blockchain-based records. The key concept underpinning Article 12 is that of the "controllable electronic record" or CER, and the perfection of a security interest in a CER is established through 'control' of the CER.

However, Article 12 specifically states that it does not apply to investment property. How then does the UCC tie investment property to digital ledgers?

Article 8's provisions regarding security entitlements state that in order for a secured party to obtain and perfect a security interest, the securities intermediary must agree to comply with the secured party's instructions. These instructions are known as 'entitlement orders.' Article 8 does not specify how these entitlement orders can be delivered. The means of delivering these orders have evolved over time and can continue to evolve to encompass new technologies. Here the comments to Article 8 (as revised at the same time Article 12 was adopted) are instructive. The comments give examples where a controllable electronic record functions as an 'instruction' to the issuer of a security. While these examples don't reference securities intermediaries, it is easy to extrapolate and find that a movement of the CER can function as an instruction to a securities intermediary.

The creation of a digital twin of the UST fits neatly into this framework: the security interest in the underlying 'original' UST is perfected through Article 8 while the security interest in the controllable electronic record representing the UST is perfected by established control over the digital twin. However, the phrase 'digital twin' may end up creating confusion – market participants should consider simply explaining that these are securities entitlements represented by ledger entries on the blockchain.

It is important to consider how control over a CER for purposes of establishing perfection of a security interest varies between different blockchain technologies. With Canton, the clear and precise means by which assets are modeled and permissions are provided make it possible to establish control for Article 12 purposes. In fact, Canton may eventually enable a system where rather than creating a security interest over an entire account and all securities entitlements in that account, separate accounts may not be needed if entitlement orders can be made granularly at the asset level through networks like Canton.

"What makes this different is that the parties are agreeing on the technical and operations workflow, in addition to having agreed the legal control. When you're using Daml on Canton Network, an activity over a secured asset cannot happen unless both parties agree - and one such agreement is that one party, the Secured Party, can rightfully take control of the asset under pre-agreed conditions. This is perfected securities interest, now also provided in the app code and workflow, as well as in the legal contract."

Kelly Mathieson, Chief Business Development Officer, Digital Asset

Pilot Outcomes

With over 100 transactions involving four complex workflows, the tokenized USTs pilot demonstrated the ability to successfully tokenize real world assets by creating a digital twin, and then locking both the digital twin and the underlying USTs as collateral to a margin transaction. The transactions were executed by 18 market participants and overseen by six legal, regulatory, academic and consultancy institutions.

The tokenized USTs could be posted in real time and moved seamlessly and efficiently between different clearinghouses and prime brokerages to satisfy margin obligations. The ability to post and settle collateral, and recall it swiftly and securely with atomic transactions, improves collateral mobility and liquidity and enables investors and secured parties to optimize their use of collateral.

Turning to the worst case scenario of default, the pilot also evidenced the ability of secured parties to perfect title on and take control over the tokenized and underlying traditional asset, enabling the secured party to ultimately liquidate collateral assets in case of default of a trading counterparty. This is the necessary and final step in proving the utility of a digital twin and interoperable blockchains within a real world collateral scenario.

The pilot successfully demonstrated tangible benefits to the market participants involved in collateral transactions.

- **Collateral becomes more mobile and liquid.** It can be pledged and recalled more quickly with atomic transactions that remove settlement risk. Intraday collateralization becomes possible with 24/7 instant settlement.
- **Operational efficiency improves substantially** with no market moves or potential for trade fails. A single golden source of data removes layers of time-consuming reconciliation throughout the transaction chain.
- **Data synchronization enhances visibility.** Participants get real time information on collateral pledged, received and moved.
- **Composable and truly atomic transactions** can take place across multiple sovereign instances of Canton, removing the reliance on messages and bridges and eliminating counterparty acceptance risk.
- **Privacy is assured,** as the Canton protocol ensures participants see only the data and pieces of the transaction to which they are entitled.
- **Market transparency increases.** Transparency and auditability allow for the market-wide regulatory oversight necessary to further adoption of digital assets.
- **Secured parties have legal certainty of ownership.** With an immutable ledger and asset locked to the transaction, the secured party can be confident in their ability to seize collateral and change ownership in accordance with legal parameters in the event of a closeout.

While the pilot scenarios focused on unilateral collateral agreements for simplicity, these opportunities can extend more broadly to more complex collateral arrangements. Using existing applications created for the Canton Network pilot can accelerate time to market while Daml and Canton enable native interoperability.

Next steps

Following the successful conclusion of the pilot, Digital Asset and DTCC will collaborate to connect the Canton Network applications to the DTCC LedgerScan platform. Pilot participants and other interested organizations can leverage this infrastructure and learnings from the pilot to implement a production solution.

Contact us

Learn more about the pilot, Canton applications or the Canton Network.

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Additional resources

- The Canton Network: A Regulatory Perspective
- Beyond Public Versus Private: Connectivity and Control Within Regulatory Guardrails with Canton
- Canton Global Synchronizer and Canton Coin Go Live
- Canton Pilot Report
- Canton website